

LESSON 8 CONSTRUCTION DOCUMENTS

DRILLED SHAFT FOUNDATION INSPECTION

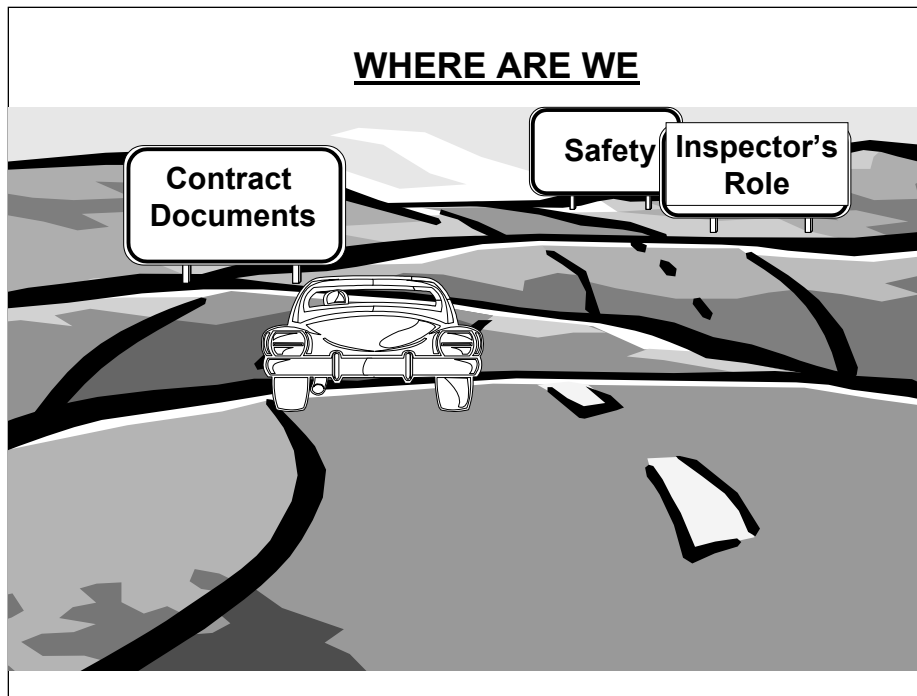
DECEMBER 2002

Participant Workbook

LESSON 8

CONSTRUCTION DOCUMENTS

8-3



LEARNING OBJECTIVES

- **Identify key inspection elements of the contract documents**
- **Locate Plan Sheet Details Related to Drilled Shafts**
- **Identify key elements of the Drilled Shaft Installation Plan**
- **Explain the governing order of specifications**

8-5

**PLANS AND
SPECIFICATIONS
CHECKLISTS**



8-6

PLANS AND SPECIFICATIONS CHECKLIST

The Inspector needs to be able to locate the following in the Plans and Specifications and be familiar with them before the job commences. **These documents should be with you at the job site and all times for reference.**

YES	NO	PLANS	
		Revisions	
		Key Sheets	
		Construction Estimate Sheet	
		Plan/Profile Sheets	
		Traffic Control Plans	
		Drainage Plans	
		Utility Adjustments	
YES	NO	STRUCTURES PLANS	
		General Notes	
		Report of Core Borings	
		Foundation Layout	
		Details	
		Bridge Hydraulic Sheet	
YES	NO	SPECIFICATIONS	
		Technical Special Provisions	
		Standard Specifications	
		Supplemental Specs	
		Drilled Shaft Installation Plan	

“MUST HAVE” REFERENCES FOR INSPECTORS

MUST HAVE	NICE TO HAVE
<ul style="list-style-type: none"> • Approved Drilled Shaft Installation Plan • Project Geotechnical Report • Complete set of Project Plans with Pay Items • Minutes of Previous Meetings • Special Provisions • Technical Special provisions for project 	<ul style="list-style-type: none"> • This class Notebook • Drilled Shaft Inspector's Manual • Standard Specifications for Road and Bridge Construction • Supplemental Specifications • Road Design, Structures and Traffic Operations Standards • ADSC Drilled Shaft Inspector Manual

8-8

As a drilled shaft Inspector you can perform your duties only if you know and understand the construction of drilled shafts as well as the project to be constructed. That is, you must know what the design intent was, how the Contractor proposes to construct the shafts, and the specifications which are your tools to assure that the drilled shafts are properly constructed.

Several of the pertinent items that a drilled shaft Inspector needs are standard specifications and documents applicable to drilled shafts on all Department of Transportation projects. Other items are project specific items such as plans, special provisions, shop drawings, and contractor submittals.

Presented above is a brief list of items that the drilled shaft Inspector should have in his or her possession prior to start of the drilled shaft work.

KEY PARTS OF THE PLANS & SPECIFICATIONS

COMPONENT	IMPORTANCE
Plan Revisions	Always check for revised sheets to see if there are any changes that affect the shaft construction.
Other Plans	Familiarize yourself with the plans, know where to find things quickly.
Key Sheet	Shows what is contained in the plan set, revisions, location, project number
Const. Est. Sheet	1) Quantities 2) Pay Items

8-9

KEY PARTS OF THE PLANS & SPECIFICATIONS

COMPONENT	IMPORTANCE
Drainage Map	Good for showing area- usually an aerial map
Plan and Profile	Good for project layout- shows location of utilities. All utilities are not necessarily shown and locations may not be correct.
Utilities	Shows utilities, & relocations/ abandonments/removals
Traffic Control	Can show how project may be phased. May control foundation installation.

8-10

KEY PARTS OF THE PLANS & SPECIFICATIONS

STRUCTURAL PLANS	IMPORTANCE
General Notes	1) This sheet may contain notes that changes application of specifications. Also will have design assumptions made. Scour should agree with Bridge Hydraulics Table.
Standard Drawings	Standard Index Drawings showing Drilled Shaft details.
General Plan & Elevation	1) Shows layout and elevation of bridge & foundation (one or more sheets) 2) Will show number of bents/piers. Can tell whether pier or bent. 8-11

KEY PARTS OF THE PLANS & SPECIFICATIONS

STRUCTURAL PLANS	IMPORTANCE
Bridge Hydr. Sheet	Shows scour elevations- should match Drilled Shaft Data Table
Rpt. of Core Borings	Shows subsurface conditions used in design of the drilled shafts. Must know.
Foundation Layout	Shows the specific location of drilled shafts and test shafts. Data Table.
Bent/Pier Plans	Shows specifics of each bent/pier including elevation of top-of-shaft.

8-12

Technical Special Provisions

EXAMPLE

TECHNICAL SPECIAL PROVISION

FOR

Item Number 2455-111

Core (Shaft Excavation)

State Project Numbers: 59110-3508

Work Program Numbers: 3118647

SR 30, Wakulla County

EXAMPLE

TECHNICAL SPECIAL PROVISION

FOR

Item Number 2455-111

Core (Shaft Excavation)

State Project Numbers: 59110-3508

Work Program Numbers: 3118647

SR 30, Wakulla County

PAGE 431. Subarticle B455-3.6 Excavations is expanded as follows:

Coring shall be performed in accordance with ASTM D 2113 Standard Practice for Diamond Core Drilling for Site Investigation, except that a single-tube core barrel will not be allowed for coring and retrieving the undisturbed samples produced during the Core (Shaft Excavation).

LEARNING OBJECTIVE #1

Identify key inspection elements of the contract documents

Scour elevations can generally be found on which plan set sheet(s)?

Generally, drilled shaft top elevations can be found on which plan set sheet(s)?

8-16

LEARNING OBJECTIVE #1

Identify key inspection elements of the contract documents

Subsurface conditions information can generally be found on which plan set sheet(s)?

Where is the Drilled Shaft Data Table usually found?

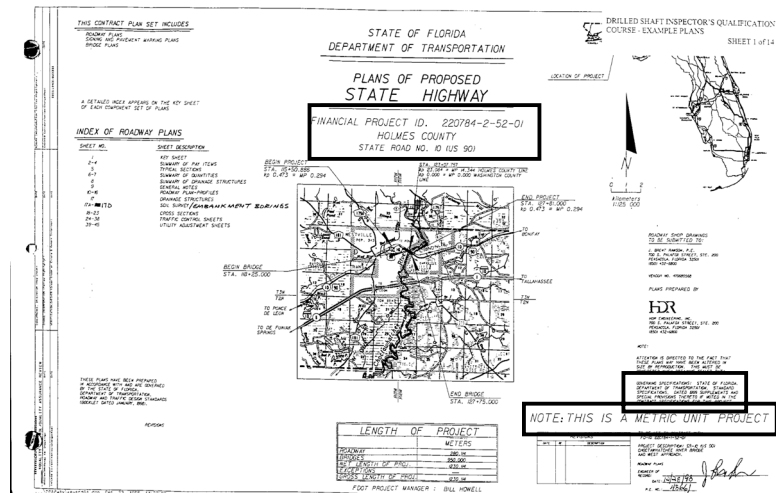
8-17

CONSTRUCTION DRAWING REVIEW

8-18

It is extremely important that not only you know how to locate pertinent parts of the plans but have them with you on the job-site at all times.

Construction Drawing 1



Construction Drawing 2

12/01/94
12/01/94

1

DRILLED SHAFT INSPECTOR'S QUALIFICATION
COURSE - EXAMPLE PLANS

SHEET 3 OF 3

CESS 15-4
PAGE 01 OF 01

WARRANTY 02 COUNTY 32 SECTION 016
22094-2-10-01

SUMMARY OF BID PRICE		PAY ITEMS			
S#	ITEM	ITEM	UNIT	QUANTITY	UNIT PRICE
C1	NUMBER				
11110-1	STRUCTURE REMOVAL OF EXISTING	100 (100/240000)			
11110-2	CONCRETE CLASS 7	1 (100/240000)			
11110-3	CONCRETE CLASS 7	1 (100/240000)			
11110-4	CONCRETE CLASS 7	1 (100/240000)			
11110-5	CONCRETE CLASS 7	1 (100/240000)			
11110-6	CONCRETE CLASS 7	1 (100/240000)			
11110-7	CONCRETE CLASS 7	1 (100/240000)			
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11110-99	CONCRETE CLASS 7	1 (100/240000)			
11110-100	CONCRETE CLASS 7	1 (100/240000)			

NOTE 1 - IDENTIFIES ITEMS NORMALLY REQUIRING SHOP DRAWINGS - CONTRACTOR SHALL OBTAIN/SEEK OTHER ITEMS REQUIRING SHOP DRAWINGS.

J. H. H. 11/23/93

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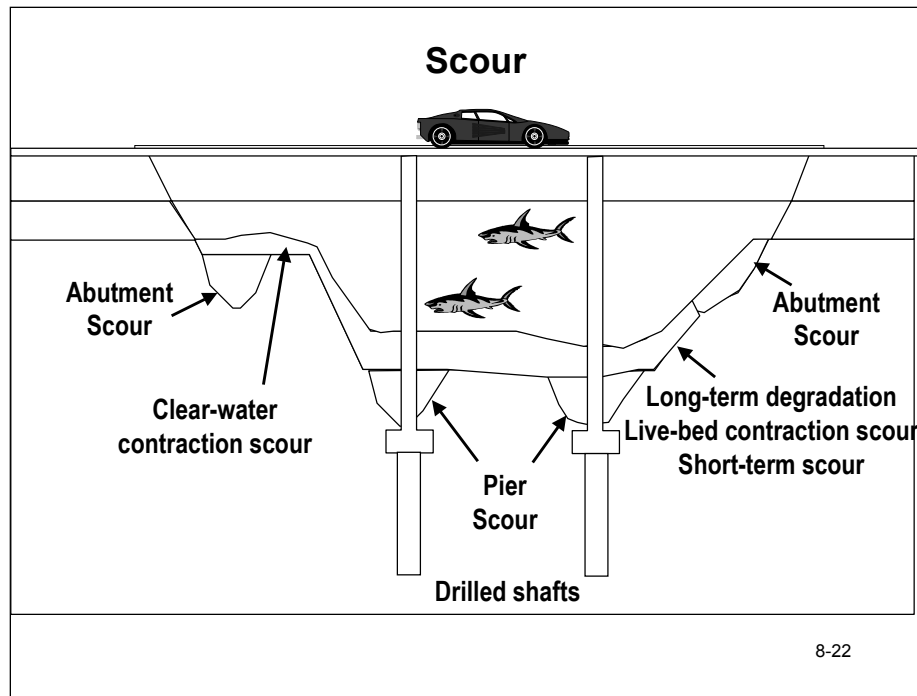
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Construction Drawing 3

[illegible]



Scour around the pier and timber piles from a 50-year storm caused the collapse of the bridge.

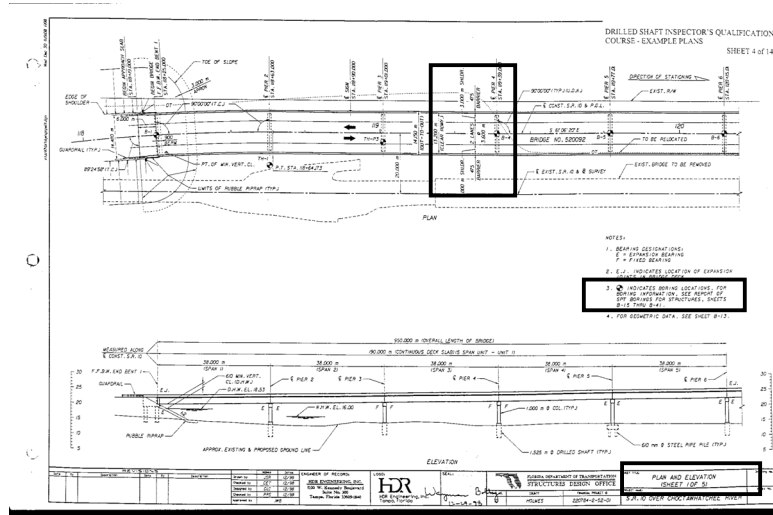


The embankment material beneath this abutment was removed by scour forces.

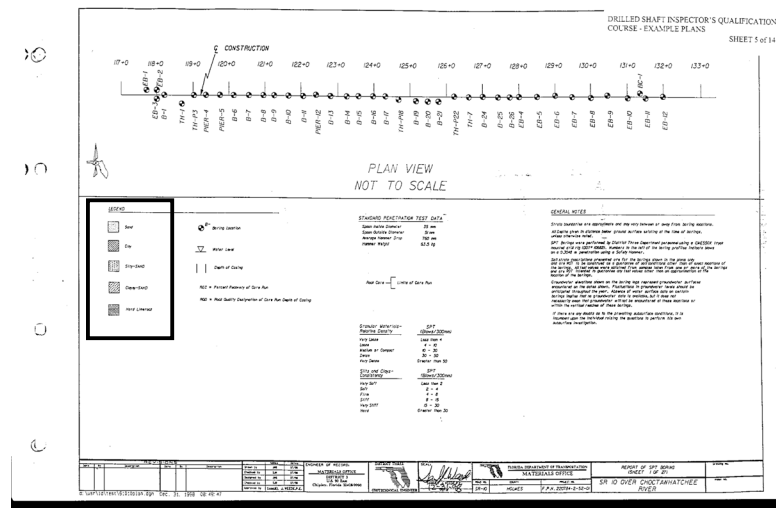


This abutment was protected by riprap, but still was undermined by scour forces.

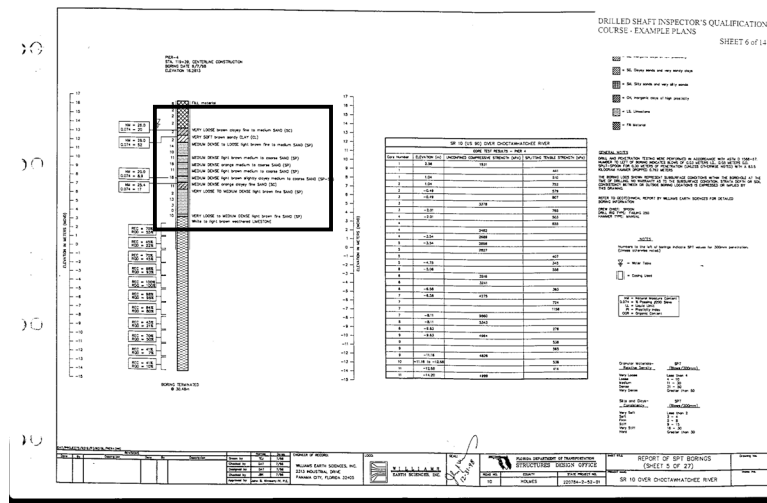
Construction Drawing 4



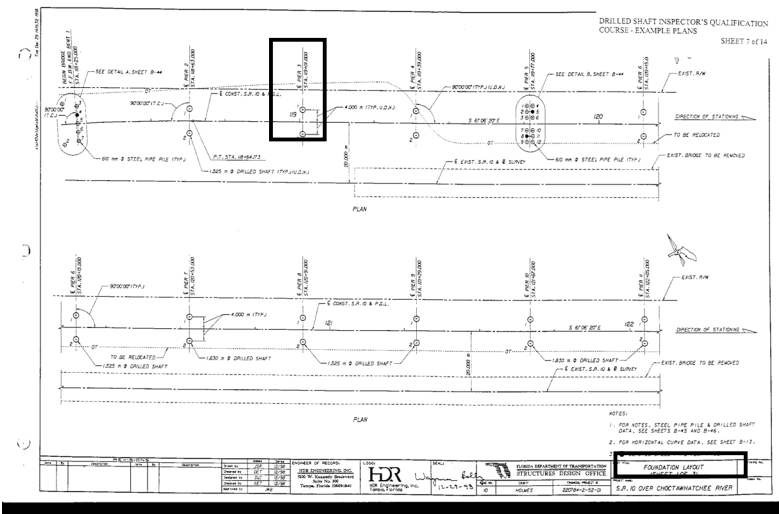
Construction Drawing 5



Construction Drawing 6



Construction Drawing 7

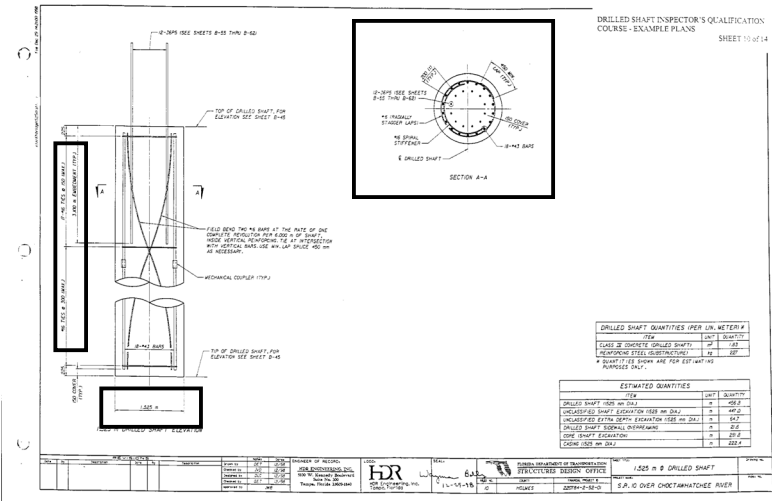


Construction Drawing 8

DRILLED SHAFT INSPECTION QUALIFICATION
 COURSE: EXAMPLE PLANS
 SHEET 8 of 14

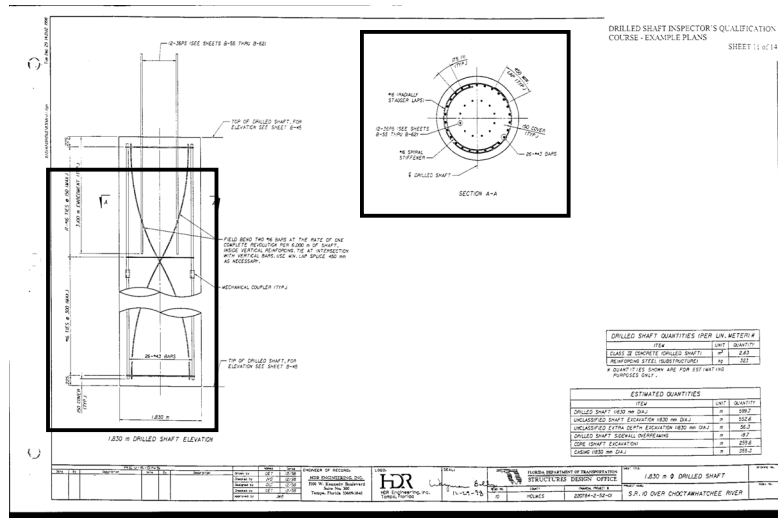
DRILLED SHAFT DATA TABLE									
INSTALLATION DATA					DESIGN DATA				
POST	SHAFT ELEVATION	HEAD ELEVATION	INTEGRATED ELEVATION	PROPOSED ELEVATION	JOINT ELEVATION	DESIGN ELEVATION	DESIGN ELEVATION	DESIGN ELEVATION	#
1	501	-4.00	-0.30	1.80	-1.30	750	N/A	27	0.0
2	501	-4.00	-1.57	1.61	-0.06	750	N/A	27	0.0
3	501	-4.00	-2.30	1.30	-1.40	750	N/A	27	0.0
4	501	-2.00	-1.40	1.30	-1.30	750	N/A	27	0.0
5	601	-7.00	-1.52	1.40	-1.37	750	N/A	27	0.0
6	501	-6.00	-2.20	1.30	-1.30	750	N/A	27	0.0
7	601	-4.00	-2.55	1.58	-1.58	750	N/A	27	0.0
8	501	-4.00	-3.20	1.30	-1.30	750	N/A	27	0.0
9	601	-2.00	-2.14	1.26	-1.23	750	N/A	18	0.0
10	601	-3.00	-2.91	1.40	-1.40	750	N/A	18	0.0
11	601	-2.00	-2.94	1.36	-1.34	750	N/A	18	0.0
12	601	-2.00	-3.64	1.30	-1.30	750	N/A	18	0.0
13	601	-2.00	-4.34	1.30	-1.30	750	N/A	18	0.0
14	601	-2.00	-5.04	1.30	-1.30	750	N/A	18	0.0
15	601	-2.00	-5.74	1.30	-1.30	750	N/A	18	0.0
16	601	-2.00	-6.44	1.30	-1.30	750	N/A	18	0.0
17	601	-2.00	-7.14	1.30	-1.30	750	N/A	18	0.0
18	601	-2.00	-7.84	1.30	-1.30	750	N/A	18	0.0
19	601	-2.00	-8.54	1.30	-1.30	750	N/A	18	0.0
20	601	-2.00	-9.24	1.30	-1.30	750	N/A	18	0.0
21	601	-2.00	-9.94	1.30	-1.30	750	N/A	18	0.0
22	601	-2.00	-10.64	1.30	-1.30	750	N/A	18	0.0
23	601	-2.00	-11.34	1.30	-1.30	750	N/A	18	0.0
24	601	-2.00	-12.04	1.30	-1.30	750	N/A	18	0.0
25	601	-2.00	-12.74	1.30	-1.30	750	N/A	18	0.0
26	601	-2.00	-13.44	1.30	-1.30	750	N/A	18	0.0
27	601	-2.00	-14.14	1.30	-1.30	750	N/A	18	0.0
28	601	-2.00	-14.84	1.30	-1.30	750	N/A	18	0.0
29	601	-2.00	-15.54	1.30	-1.30	750	N/A	18	0.0
30	601	-2.00	-16.24	1.30	-1.30	750	N/A	18	0.0
31	601	-2.00	-16.94	1.30	-1.30	750	N/A	18	0.0
32	601	-2.00	-17.64	1.30	-1.30	750	N/A	18	0.0
33	601	-2.00	-18.34	1.30	-1.30	750	N/A	18	0.0
34	601	-2.00	-19.04	1.30	-1.30	750	N/A	18	0.0
35	601	-2.00	-19.74	1.30	-1.30	750	N/A	18	0.0
36	601	-2.00	-20.44	1.30	-1.30	750	N/A	18	0.0
37	601	-2.00	-21.14	1.30	-1.30	750	N/A	18	0.0
38	601	-2.00	-21.84	1.30	-1.30	750	N/A	18	0.0
39	601	-2.00	-22.54	1.30	-1.30	750	N/A	18	0.0
40	601	-2.00	-23.24	1.30	-1.30	750	N/A	18	0.0
41	601	-2.00	-23.94	1.30	-1.30	750	N/A	18	0.0
42	601	-2.00	-24.64	1.30	-1.30	750	N/A	18	0.0
43	601	-2.00	-25.34	1.30	-1.30				

Construction Drawing 10

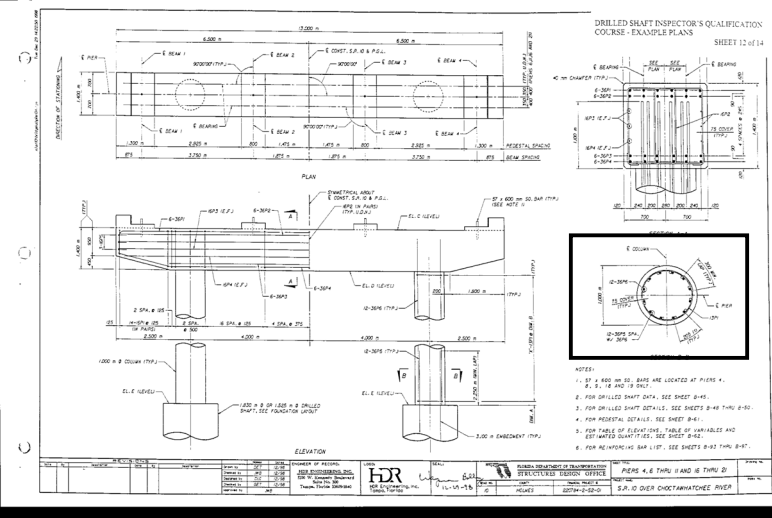


8-29

Construction Drawing 11



Construction Drawing 12



Construction Drawing 13

DRILLED SHAFT INSPECTOR'S QUALIFICATION
COURSE - EXAMPLE PLANS
SHEET 13 of 14

DRILLED SHAFT STATNOMIC LOAD TEST
INSTALLATION TABLE

TEST SITE NO.	LOCATION	REFERENCE BORING	SIZE OF SHAFT, IN.	ANTICIPATED LOADING (T/P/LL), IN	SHAFT TIP (T/P/LL), IN	ROCK STRATUM LENGTH, IN
1	STA. 10+00	74-2	18.0	0.00	0.00	0.00
2	STA. 10+20	81-2	18.0	0.00	0.00	0.00
3	STA. 10+40	81-2	18.0	0.00	0.00	0.00

STATNOMIC LOAD TEST RESULTS	
STATNOMIC LOAD TEST RESULTS	10,000 TN
STATNOMIC LOAD TEST RESULTS	6,000 TN
STATNOMIC LOAD TEST RESULTS	10,000 TN

STATNOMIC LOAD TEST RESULTS	
STATNOMIC LOAD TEST RESULTS	10,000 TN
STATNOMIC LOAD TEST RESULTS	6,000 TN
STATNOMIC LOAD TEST RESULTS	10,000 TN

**DRILLED SHAFT
LOAD TEST**

1. Static
2. Statnomic
3. Osterberg

NOTES:

1. SEE ALL DIMENSIONS SHALL BE INSTALLED AT THE
BOTTOM OF THE SHAFT.

2. THE -0.00 SHALL BE THE ELEVATION AS SHOWN ON
THE PLANS AND SHALL BE THE ELEVATION OF THE
TOP OF THE SHAFT.

3. THE -0.00 SHALL BE THE ELEVATION OF THE
TOP OF THE SHAFT.

NO.	DATE	DESCRIPTION	BY	CHECKED	APPROVED	REVISION
1	10/10/10	DRILLED SHAFT STATNOMIC LOAD TEST	J. J. J.	J. J. J.	J. J. J.	1

DRILLED SHAFT STATNOMIC LOAD TEST

STATNOMIC LOAD TEST RESULTS

STATNOMIC LOAD TEST RESULTS

STATNOMIC LOAD TEST RESULTS

STATNOMIC LOAD TEST RESULTS

STATNOMIC LOAD TEST RESULTS

STATNOMIC LOAD TEST RESULTS

STATNOMIC LOAD TEST RESULTS

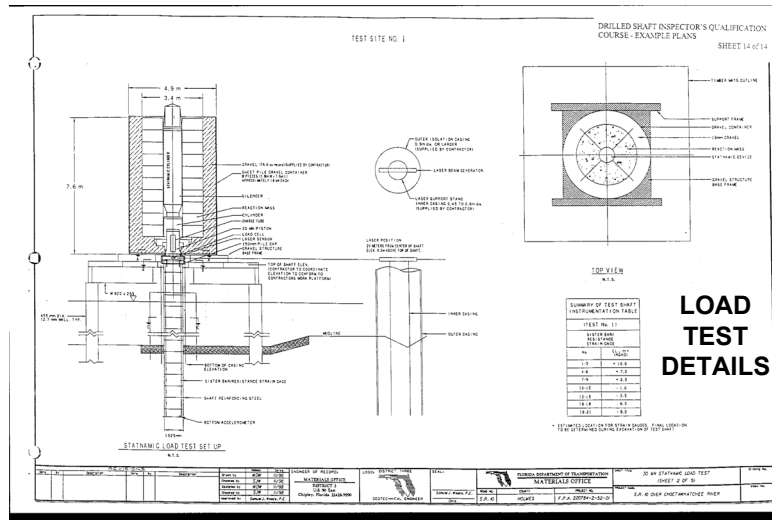
STATNOMIC LOAD TEST RESULTS

STATNOMIC LOAD TEST RESULTS

STATNOMIC LOAD TEST RESULTS

STATNOMIC LOAD TEST RESULTS

Construction Drawing 14



DRILLED SHAFT INSTALLATION PLAN

**REQUIRED ON DOT
PROJECTS WITH DRILLED SHAFT
FOUNDATIONS**

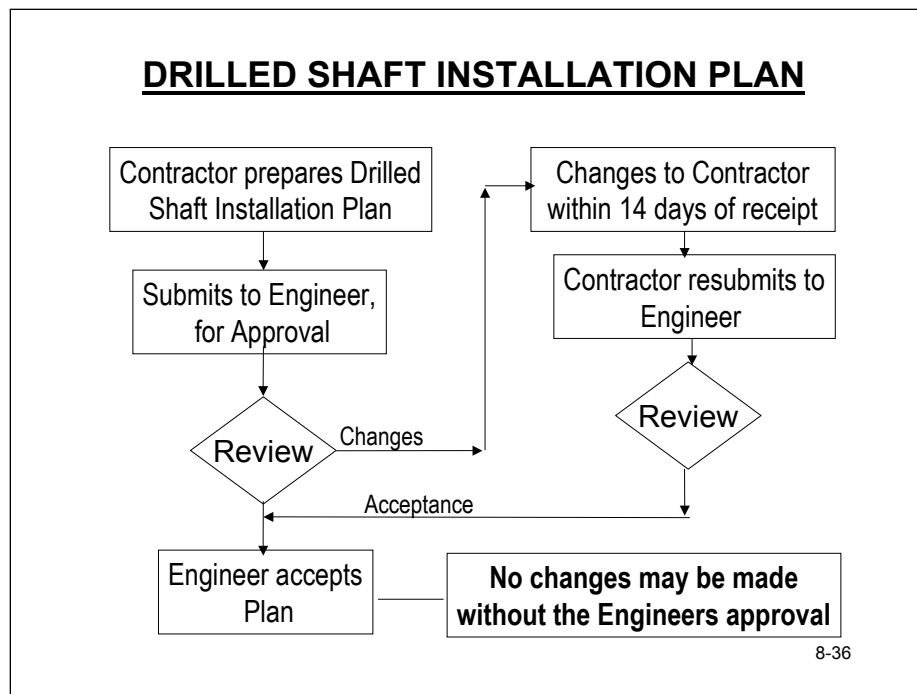
SAMPLE SUMMARY OF DRILLED SHAFT INSTALLATION PLAN			
a. Name of Drilled Shaft Superintendent Experience _____			FHWA Pub. IF-99-025 xxx-12 (x)
b. EQUIPMENT	MANUFACTURER	MODEL	SIZE
Drill Rig			
Crane			
Augers			
Casting			
Bailing Bucket			
Final Cleaning Equipment			
Decastering			
Slurry Pump			
Core Sampling Equipment			
Concrete pump			
c. Sequence of Construction: How many times _____		d. Sequence of Shaft Construction: Starts or Shaft groups _____	
Note: many shafts _____			
e. Details of Shaft Construction Methods _____			
f. Details of Slurry: Type _____		Method to mix/slurry _____	
Testing _____		Name of Lab _____	
g. Details of method to clean shafts after initial excavation _____			
h. Details of Shaft Reinforcement _____			
i. Details of Concrete placement procedures: Concrete or Pumpcrete _____		Overfilling shaft: _____	
Provisions to ensure final shaft shaft elevations: _____		Initial placement: _____	
j. Details of Casting Removal: _____			
k. Required Submittals: Shaft Drawings _____		Concrete Mix Design: _____	
l. Details of Load Test: Equipment _____		Provisions for Jacks or Loadcells _____	
m. Prevention of Displacement of Castings/Shafts during Placement _____			
n. Completion of Pile _____		Method _____	
o. Environmental control procedures to prevent loss of slurry or concrete into waterways: _____			
p. Other Information: _____			

OVERVIEW

The Drilled Shaft Installation Plan is a shop drawing describing in detail the Contractor's tools and methods of constructing the drilled shafts. Section xxx. SUBMITTALS of FHWA Publication IF-99-025, Drilled Shafts: Construction Procedures and Design Methods, describes the minimum requirements of the Drilled Shaft Installation Plan. The idea behind having the Contractor submit this item is to cause him to put thought and planning into the project. Normally contractors want to take a "wait and see" attitude, where a general approach to the task is identified and a list of probable equipment to be used is given. For most contractors, that is the extent of their pre-job planning, relying heavily on flexibility to adjust once on site, as the job begins to develop. There are so many uncontrollable unknowns when dealing with subsurface conditions, that it seems the Contractor would benefit himself to pay closer attention to details regarding methods of installation and equipment ahead of time, minimizing some of the unknown factors. A smooth and successful start will usually be carried all the way through the job.

SAMPLE SUMMARY OF DRILLED SHAFT INSTALLATION PLAN

a. Name of Drilled Shaft Superintendent _____ Experience _____ _____			FHWA Pub. IF-99-025 xxx.12 (a)	
b. EQUIPMENT	MANUFACTURER	MODEL	SIZE	
Drill Rig				
Crane				
Augers				
Casing				
Bailing Bucket				
Final Cleaning Equipment				
Desanding				
Slurry Pump				
Core Sampling Equipment				
Concrete pump				
c. Sequence of Construction: How many crews _____ c. Sequence of Shaft Construction: Bents or Shaft groups _____ How many shafts _____				
d. Details of Shaft Excavation Methods				
e. Details of Slurry: Type _____ Method to mix/circulate _____ Desand _____ Testing: _____ Name of Lab _____				
f. Details of method to clean Shafts after initial excavation:				
g. Details of Shaft Reinforcement:				
h. Details of Concrete placement procedures: Concrete or Pump tremie _____ Initial placement _____ Raising during placement _____ Overfilling shaft _____ Provisions to ensure final shaft Cutoff Elevations:				
i. Details of Casing Removal:				
1. Required Submittals Shop Drawings _____ Concrete Mix Design _____ Steel Mill Certifications, etc. _____				
2. Details of Load Test: Equipment _____ Procedure _____ Calibration for Jacks or Loadcells _____				
3. Prevention of Displacement of Casing/Shafts during Placement Compaction of Fill _____ Method _____ Equipment _____				
4. Environmental control procedures to prevent loss of slurry or concrete into waterways:				
5. Other information:				



FHWA Publication IF-99-025455

xxx. 12 SUBMITTALS

....No later than one month prior to constructing drilled shafts, the Contractor shall submit an installation plan for review. This plan shall provide information on the following:

.... The Engineer will evaluate the drilled shaft installation plan for conformance with the plans, specifications and special provisions. Within 14 days after receipt of the installation plan, the Engineer will notify the Contractor of any additional information required and/or changes necessary to meet the contract requirements. All procedural approvals given by the Engineer shall be subject to trial in the field and shall not relieve the Contractor of the responsibility to satisfactorily complete the work as detailed in the plans and specifications.

DRILLED SHAFT INSTALLATION PLAN

XXX.12 SUBMITTALS

a. Name and experience record of drilled shaft superintendent who will be in charge of drilled shaft operations for this project.

SAMPLE SUMMARY OF DRILLED SHAFT INSTALLATION PLAN			
a. Name of Drilled Shaft Superintendent Name _____			FHWA Pub. IF-09-025 XXX.12 (a)
Address _____			
EQUIPMENT	MANUFACTURER	MODEL	SIZE
Drill Rig			
Casing			
Augers			
Casting			
Reinforcing Bucket			
Form/Churning Equipment			
Desanding			
Slurry Pump			
Cores Sampling Equipment			
Concrete pump			
c. Sequence of Construction: How many crews _____ c. Sequence of Shaft Construction: Shafts or Shaft groups _____			
d. Details of Shaft Excavation Methods _____			
e. Details of Slurry: Type _____ Method to mix/circulate _____ Desand _____			
f. Details of method to clean Shafts after initial excavation _____			
g. Details of Shaft Reinforcement _____			
h. Details of Concrete placement procedures: Concrete or Pump from _____ Initial placement _____			
i. Details of Casting Process: _____			
j. Required Submittals: Shaft Drawings _____ Concrete Mix Design _____			
k. Details of Load Test: Equipment _____ Calibration for load/capacity _____			
l. Prevention of Displacement of Casing/Shafts during Placement _____			
m. Environmental control procedures to prevent _____			
n. Other Information _____			

DRILLED SHAFT INSTALLATION PLAN

XXX.12 SUBMITTALS

b. List of proposed equipment to be used, including cranes, drills, augers, bailing buckets, final cleaning equipment, desanding equipment, slurry pumps, core sampling equipment, tremies or concrete pumps, casings, etc.

SAMPLE SUMMARY OF DRILLED SHAFT INSTALLATION PLAN			
a. Name of Drilled Shaft Superintendent Experience _____			FHWA Pub. IF-69-025 xxx.12 (a)
b. EQUIPMENT	MANUFACTURER	MODEL	SIZE
Drill Rig			
Crane			
Augers			
Casing			
Bailing Bucket			
Cleaning Equipment			
Desanding			
Slurry Pump			
Core Sampling Equipment			
Concrete pump			
c. Sequence of Construction: How many rows _____		d. Sequence of Shaft Construction: Bats or Shaft groups _____	
How many shafts _____			
e. Details of Shaft Excavation Methods _____			
f. Details of Slurry: Type _____		Method to mix/slurry _____	
Name of Lab _____		Desand _____	
g. Details of method to clean shafts after initial excavation _____			
h. Details of Shaft Reinforcement _____			
i. Details of Concrete placement procedure: Concrete or Pump lines _____		Initial placement _____	
Raising during placement _____		Chaffing shaft _____	
j. Details of Load Test: Equipment _____			
Procedure _____		Calculation for facts or loads _____	
k. Prevention of Displacement of Casing/Shafts during Placement _____			
Comparison of FS _____		Method _____	
l. Environmental control procedures to prevent loss of slurry or concrete into waterways _____			
m. Other information: _____			

DRILLED SHAFT INSTALLATION PLAN

XXX.12 SUBMITTALS

c. Details of sequence of construction operations and sequence of shaft construction in bents or shaft groups.

SAMPLE SUMMARY OF DRILLED SHAFT INSTALLATION PLAN			
Name of Chief Shaft Superintendent Experience		FHWA Pub. #F-99-025 xxx.12 (a)	
EQUIPMENT		MANUFACTURER	MODEL
Drill Rig			
Crane			
Augers			
Casing			
Building Bucket			
Final Cleaning Equipment			
Cementing			
Slurry Pump			
Cone Sampling Equipment			
Concrete pump			
a. Sequence of Construction: How many rows		c. Sequence of Shaft Construction: Bents or Shaft groups	
b. Sequence of Construction: How many shafts			
d. Details of Shaft Excavation Methods			
e. Details of Blurry: Type Method to install/collapse Demand			
f. Details of method to clean shafts after initial excavation			
g. Details of Shaft Reinforcement			
h. Details of Concrete placement procedure: Concrete or Pump truck Initial placement			
i. Details of Lined Test: Equipment Calibration for Jacks or Load cells			
j. Details of Displacement of Casing/Shafts during Placement			
k. Environmental control procedures to prevent loss of slurry or concrete into waterways			
l. Other Information			

DRILLED SHAFT INSTALLATION PLAN

XXX.12 SUBMITTALS

d. Details of shaft excavation methods.

**SAMPLE SUMMARY OF
DRILLED SHAFT INSTALLATION PLAN**

Name of Chief Shaft Superintendent Experience		FHWA Pub. #F-99-025 xxx 12 (a)	
1. EQUIPMENT		MANUFACTURER	MODEL
Drill Rig			
Crane			
Augers			
Casing			
Bailing Bucket			
Final Cleaning Equipment			
Chiseling			
Slurry Pump			
Core Sampling Equipment			
Concrete pump			
a. Sequence of Construction: How many shafts		c. Sequence of Shaft Construction: Series or Shaft group	
2. Details of Shaft Excavation Methods			
a. Details of Shoring: Type		Method to install/rotate	
Timing		Name of Lab	
b. Details of method to clean shafts after initial excavation			
3. Details of Shaft Reinforcement			
a. Details of Concrete placement procedure: Concrete or Pump truck		Initial placement	
Raising during placement		Overfilling shaft	
Procedures to ensure that shaft is full of concrete			
4. Details of Casing Removal			
b. Required Submittals: Shaft Drawings		Concrete Mix Design	
c. Details of Load Test: Equipment		Calibration for Jacking or Load cells	
Prevention of Displacement of Casing/Shafts during Placement		Equipment	
d. Environmental control procedures to prevent loss of slurry or concrete into waterways			
5. Other Information			

DRILLED SHAFT INSTALLATION PLAN

XXX.12 SUBMITTALS

e. When the use of slurry is anticipated, details of the mix design and its suitability for the subsurface conditions at the construction site, mixing and storage methods, maintenance methods, and disposal procedures.

SAMPLE SUMMARY OF DRILLED SHAFT INSTALLATION PLAN			
a. Name of Drilled Shaft Superintendent Experience			FHWA Pub. IF-559-025 xxx-12 (a)
b. EQUIPMENT	MANUFACTURER	MODEL	SIZE
Drill Rig			
Coring			
Augers			
Casing			
Slurry Casing			
First Casing Equipment			
Descending			
Slurry Pump			
Cover Sampling Equipment			
Concrete pump			
c. Sequence of Construction: How many cases		e. Sequence of Shaft Construction: Bents or shaft pieces	
f. Details of Shaft Excavation Methods			
g. Details of Slurry Type		Method to incorporate	
h. Slurry		Name of Lab	
i. Details of method to close shaft after initial excavation			
j. Details of Shaft Reinforcement			
k. Details of Concrete placement procedure: Concrete or Pump beam			
Pumping during placement		Overfilling shaft	
Provisions to ensure that shaft could be removed		Initial placement	
l. Details of Casing Removal			
1. Required Submittals: Shaft Drawings		Concrete Mix Design	
2. Details of Last Test: Equipment		Procedures	
3. Provision of Displacement of Casing/Shaft during Placement		Calculation for Jacks and Controls	
4. Environmental control procedures to prevent loss of slurry or concrete into waterways		Equipment	
5. Other Information:			

DRILLED SHAFT INSTALLATION PLAN

XXX.12 SUBMITTALS

f. Details of methods to clean the shaft excavation.

SAMPLE SUMMARY OF DRILLED SHAFT INSTALLATION PLAN			
a. Name of Drilled Shaft Superintendent Experience		FHWA Pub. IF-550-025 XXX.12 (a)	
b. EQUIPMENT	IMAGE/PICTURE	MODEL	SIZE
Drill Rig			
Crane			
Augers			
Casing			
Spilling Bucket			
Final Cleaning Equipment			
Decomposing			
Slurry Column			
Cross Sampling Equipment			
Concrete pump			
c. Sequence of Construction: How many shafts		d. Sequence of Shaft Construction: Starts to Shaft groups	
4. Details of Shaft Excavation Methods			
a. Details of Shoring: Type Method to maintain			
b. Details of Shoring: Name of Lab			
c. Details of methods for clean shafts after initial excavation			
5. Details of Shaft Reinforcement			
a. Details of Concrete placement procedures: Concrete or Pump form			
b. Details of Concrete placement procedures: Initial placement			
c. Details of Concrete placement procedures: Casting shaft			
6. Details of Casting Record			
7. Required Schedule: Shaft Drawings			
8. Details of Used Test Equipment			
9. Calibration for Joints or Castability			
10. Procedure of Displacement of Castings/Shafts During Placement			
11. Displacement of Castings/Shafts During Placement			
12. Environmental control procedures to prevent loss of slurry or concrete into waterways			
13. Other Information			

DRILLED SHAFT INSTALLATION PLAN

XXX.12 SUBMITTALS

g. Details of reinforcement placement, including support and centralization methods.

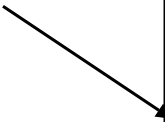
SAMPLE SUMMARY OF DRILLED SHAFT INSTALLATION PLAN			
a. Name of Drilled Shaft Superintendent Experience _____		FHWA Pub. IF-69-025 XXX.12 (a)	
b. EQUIPMENT	MANUFACTURER	MODEL	SIZE
Drill Rig			
Crane			
Augers			
Casing			
Reeling Bucket			
Final Cleaning Equipment			
Depositing			
Slurry Pump			
Cure Sampling Equipment			
Concrete pump			
c. Sequence of Construction: How many rows _____		d. Sequence of Shaft Construction: Bents or Shaft groups _____	
e. Details of Shaft Excavation Methods			
f. Details of Slurry: Type _____ Method to maintain _____			
g. Details of method to clean shafts _____			
h. Details of method to clean shafts after initial excavation _____			
i. Details of Reinforcement _____			
j. Details of Concrete placement procedures: Concrete or Pump bays _____ Initial placement _____			
k. Details of Casing Removal _____			
l. Required Submittals: Shaft Drawings _____ Concrete Mix Design _____			
m. Details of Load Test: Equipment _____ Calibration for Jacks or Loadcells _____			
n. Procedures of Placement of Casing/Shafts during Placement _____			
o. Environmental control procedures to prevent _____			
p. Other information: _____			

DRILLED SHAFT INSTALLATION PLAN

XXX.12 SUBMITTALS

h. Details of concrete placement, including proposed operational procedures for free fall, tremie or pumping methods.

SAMPLE SUMMARY OF DRILLED SHAFT INSTALLATION PLAN			
a. Name of Drilled Shaft Superintendent Experience		FHWA Pub. IF-99-025 XXX.12 (a)	
b. EQUIPMENT			
	MANUFACTURER	MODEL	SIZE
Drill Rig			
Crane			
Augers			
Casing			
Stalling Bucket			
Final Cleaning Equipment			
Decompressing			
Slurry Pump			
Cone Sampling Equipment			
Concrete pump			
c. Sequence of Construction: How many shafts		d. Sequence of Shaft Construction: Starts or Shaft groups	
e. Details of Shaft Excavation Methods			
f. Details of Shoring: Type		Method to monitor loads	
Tieback		Name of Lab	
g. Details of method to clean Shafts after initial excavation			
h. Details of Shaft Reinforcement			
i. Details of Concrete placement procedures: Concrete or Pump tremie			
Sliding during placement		Overfilling shaft	
Provisions to ensure final shaft Cutoff Elevations			
j. Details of Casing Removal			
k. Required Submittals: Shaft Drawings		Concrete Mix Design	
l. Details of Load Test: Equipment			
Procedure		Calibration for Jacks or Loadcells	
m. Prevention of Displacement of Casing/Shafts during Placement			
Composition of Fill		Method	
n. Contingencies: Control procedures to prevent loss of slurry or concrete into waterways			
o. Other information			



DRILLED SHAFT INSTALLATION PLAN

XXX.12 SUBMITTALS

i. Details of casing installation and removal methods.

SAMPLE SUMMARY OF DRILLED SHAFT INSTALLATION PLAN			
a. Name of Drilled Shaft Superintendent Experience		FHWA Pub. IF-68-025 xxx.12 (a)	
b. EQUIPMENT	MANUFACTURER	MODEL	SIZE
Drill Rig			
Crane			
Augers			
Casing			
Building Bucket			
Final Cleaning Equipment			
Decomding			
Slurry Pump			
Cone Sampling Equipment			
Concrete pump			
c. Sequence of Construction: How many shafts		d. Sequence of Shaft Construction: Shaft or Shaft group	
4. Details of Shaft Excavation Methods			
a. Details of Bore: Type		Method to maintain	
Trench		Name of Lab	
5. Details of method to clean Shafts after initial excavation			
6. Details of Shaft Reinforcement			
a. Details of Concrete placement procedure: Concrete or Pump Name		Initial placement	
Paving during placement		Overlaid shaft	
Procedures to ensure final shaft level		Reinforcement	
7. Details of Casing Removal			
1. Required Submittals: Shaft Drawings		Concrete Mix Design	
2. Details of Load Test: Equipment			
Rigging		Calculation for Joints or Locks	
3. Provision of Employment of Casing/Shaft during Placement			
Comparison of FS		Method	
Equipment			
4. Environmental control procedures to prevent loss of slurry or concrete into waterways			
5. Other information			

DRILLED SHAFT INSTALLATION PLAN

Other Information may be requested including,:

- List of required submittals (Shop drawings, Concrete Mix Designs, etc.)
- Details of load tests, if required, including equipment, calibration charts, etc.
- Methods to prevent displacement of shafts during earthwork or other construction activities
- Environmental controls

SAMPLE SUMMARY OF DRILLED SHAFT INSTALLATION PLAN																																											
a. Name of Chief Shaft Superintendent Experience:			FHWA Pub. 8F-69-025 xxx.12 (a)																																								
b. Equipment:		MANUFACTURER	MODEL SIZE																																								
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Drill Rig</td><td></td><td></td><td></td></tr> <tr><td>Cams</td><td></td><td></td><td></td></tr> <tr><td>Augers</td><td></td><td></td><td></td></tr> <tr><td>Casing</td><td></td><td></td><td></td></tr> <tr><td>Rotary Bucket</td><td></td><td></td><td></td></tr> <tr><td>Final Clearing Equipment</td><td></td><td></td><td></td></tr> <tr><td>Decompressing</td><td></td><td></td><td></td></tr> <tr><td>Shoring Piles</td><td></td><td></td><td></td></tr> <tr><td>Cone Sampling Equipment</td><td></td><td></td><td></td></tr> <tr><td>Concrete pump</td><td></td><td></td><td></td></tr> </table>				Drill Rig				Cams				Augers				Casing				Rotary Bucket				Final Clearing Equipment				Decompressing				Shoring Piles				Cone Sampling Equipment				Concrete pump			
Drill Rig																																											
Cams																																											
Augers																																											
Casing																																											
Rotary Bucket																																											
Final Clearing Equipment																																											
Decompressing																																											
Shoring Piles																																											
Cone Sampling Equipment																																											
Concrete pump																																											
c. Sequence of Construction: How many shafts		d. Sequence of Shaft Construction: Sets or Shaft groups																																									
e. Details of Shaft Excavation Methods																																											
f. Details of Blurry Type		Method to retrieve materials																																									
g. Details of Method to clean Shafts		Name of Lab																																									
h. Details of Shaft Reinforcement																																											
i. Details of Concrete placement procedures: Concrete or Pump form																																											
j. Details of Casing Removal		Initial placement																																									
k. Details of Load Test Equipment		Calibration for tests on loadable																																									
l. Details of Displacement of Casing/Shaft during Placement		Equipment																																									
m. Environmental control procedures to prevent loss of slurry or concrete into waterways																																											
n. Other information:																																											

LEARNING OBJECTIVE #3

Identify key elements of a Drilled Shaft Installation Plan

Does the Contractor have to detail how they intend to install and remove casing?

The Contractor merely needs to state he will have the right equipment for the project. True or False?

8-47

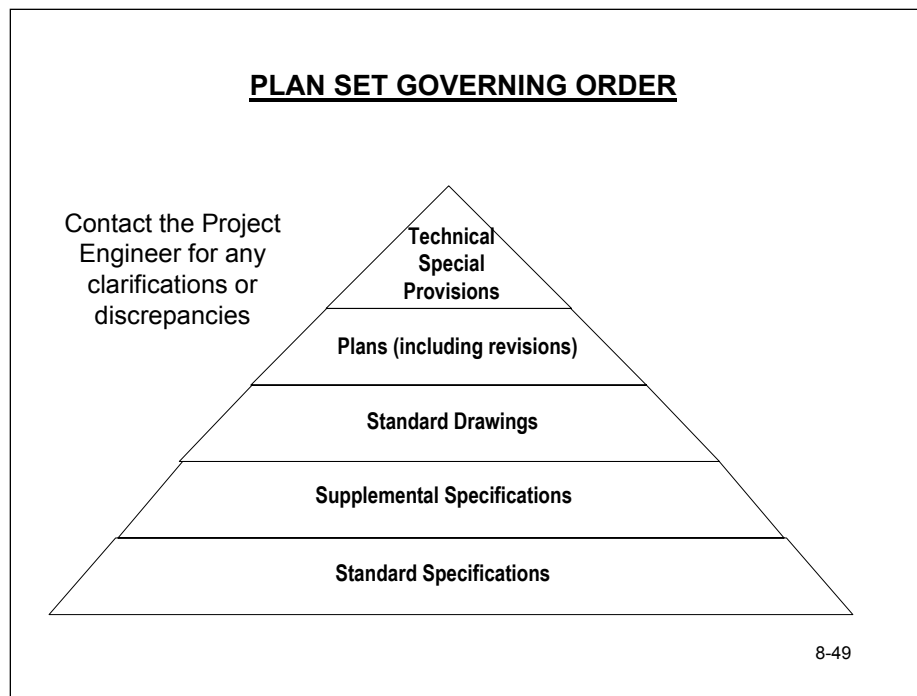
LEARNING OBJECTIVE #3

Identify key elements of a Drilled Shaft Installation Plan

Which of the following is **not** required in the Contractor's Drilled Shaft Installation Plan?

- **Details on Concrete Placement**
- **Details on Cage Reinforcement**
- **Details on shaft excavation**
- **Details on Maintenance of Traffic**
- **Details on cleaning of the excavation**

8-48



- **Technical Special Provisions-** Specifications prepared, signed and sealed by an Engineer registered in the State other than the State Specifications Engineer, or his designee, which are made part of the Contract as an attachment to the Specifications Package.
- **Plans-** The approved plans, including reproductions thereof, showing the location, character, dimensions and details of the work to be done.
- **Standard Drawings-** Some sheets in the Plans are “standard” sheets that are not designed specifically for this individual project. An example of this type of sheet might be a standard prestressed pile data sheet.
- **Developmental Standards-** A specification developed around a new process, procedure, or material and designated as a developmental specification.
- **Supplemental Specifications-** Approved additions and revisions to the Standard Specifications.
- **Standard Specifications-** The directions, provisions and requirements contained herein, together with all stipulations contained in the plans or in the contract documents, setting out or relating to the method and manner of performing the work, or to the quantities and qualities of materials and labor to be furnished under the contract.

LEARNING OBJECTIVE # 4

Explain the governing order of specifications

T or F- The Standard Specifications supercede all other contract documents.

The most narrowly focused set of documents are the?

8-50

LEARNING OBJECTIVES

- **Identify key inspection elements of the contract documents**
- **Locate plan Sheet Details Related to Drilled Shafts**
- **Identify key elements of the Drilled Shaft Installation Plan**
- **Explain the governing order of specifications**

8-51

